

Project Goal

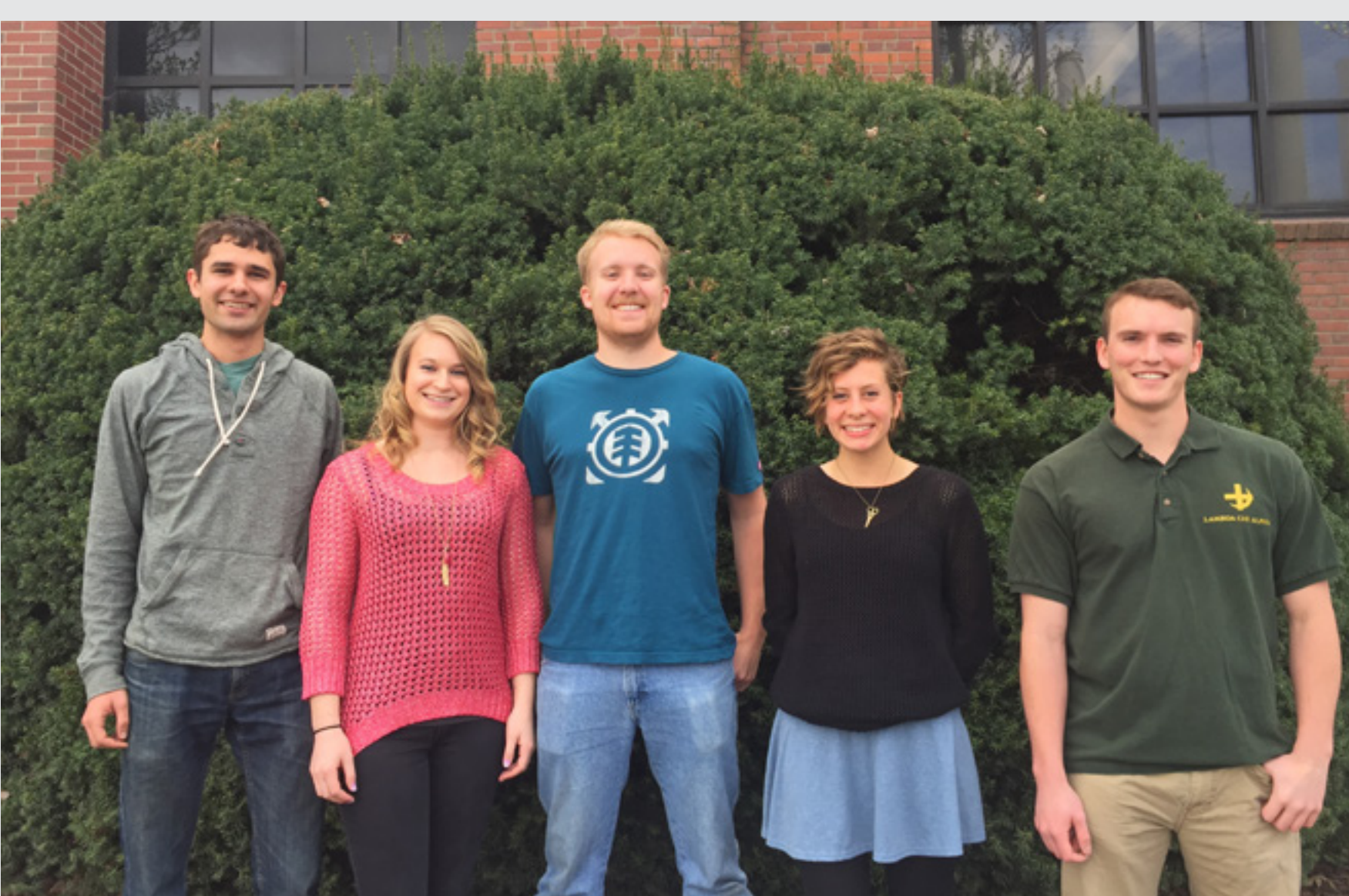
Design an actuated internal payload system to provide a new method of locomotion for the NASA SuperBall Tensegrity robot



Team Titan

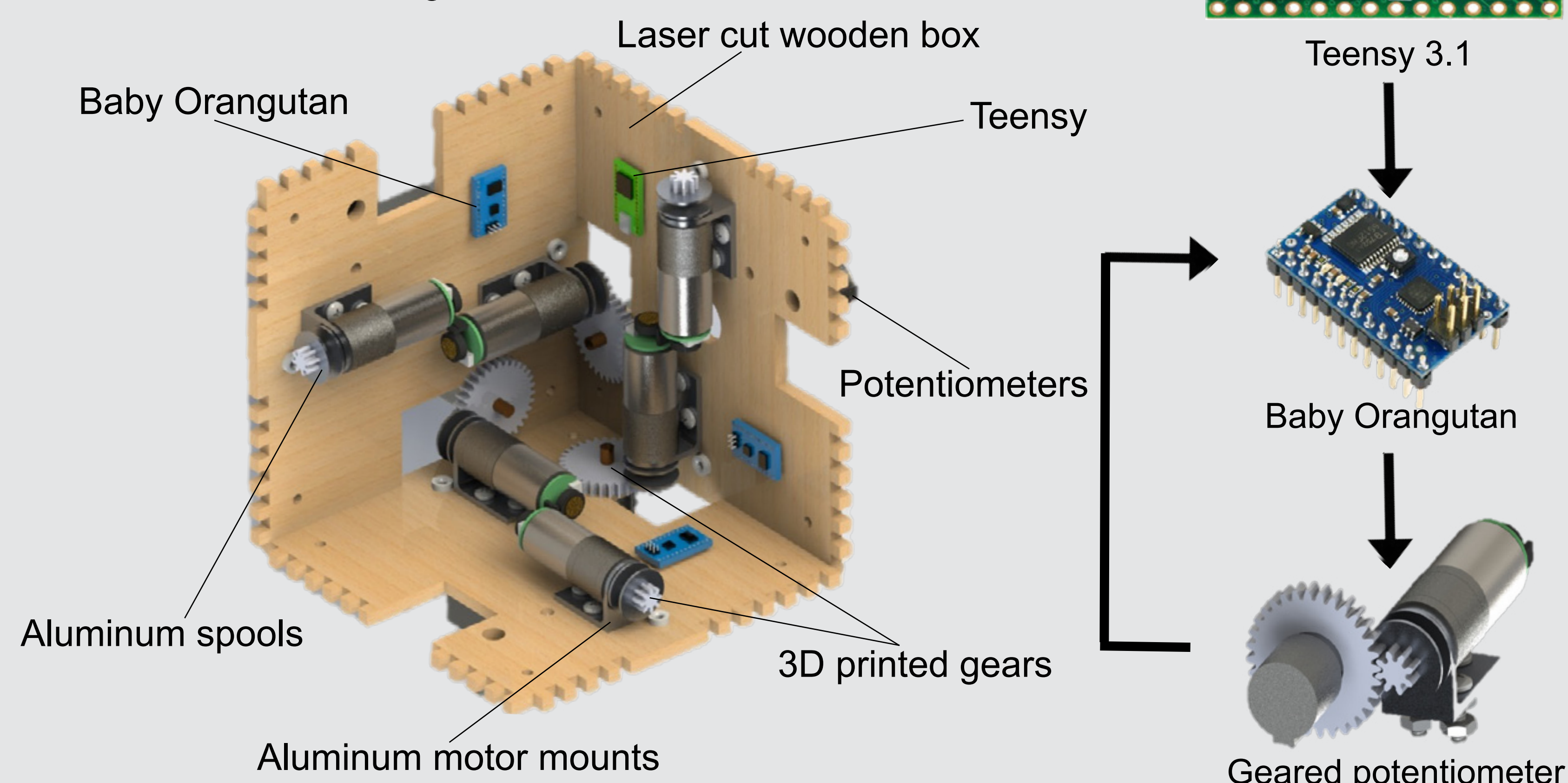
Mark Garber - ME
Kelsey Rayborn - ME
James Tigue - ME
Dylan Waterman - EE
Amy Wohlschlegel - CompE

Mentors - Stephen Goodwin & Kyle Morse
Advisor - Dr. Matthew Riley
Sponsor - Vytas SunSpiral (NASA Ames)



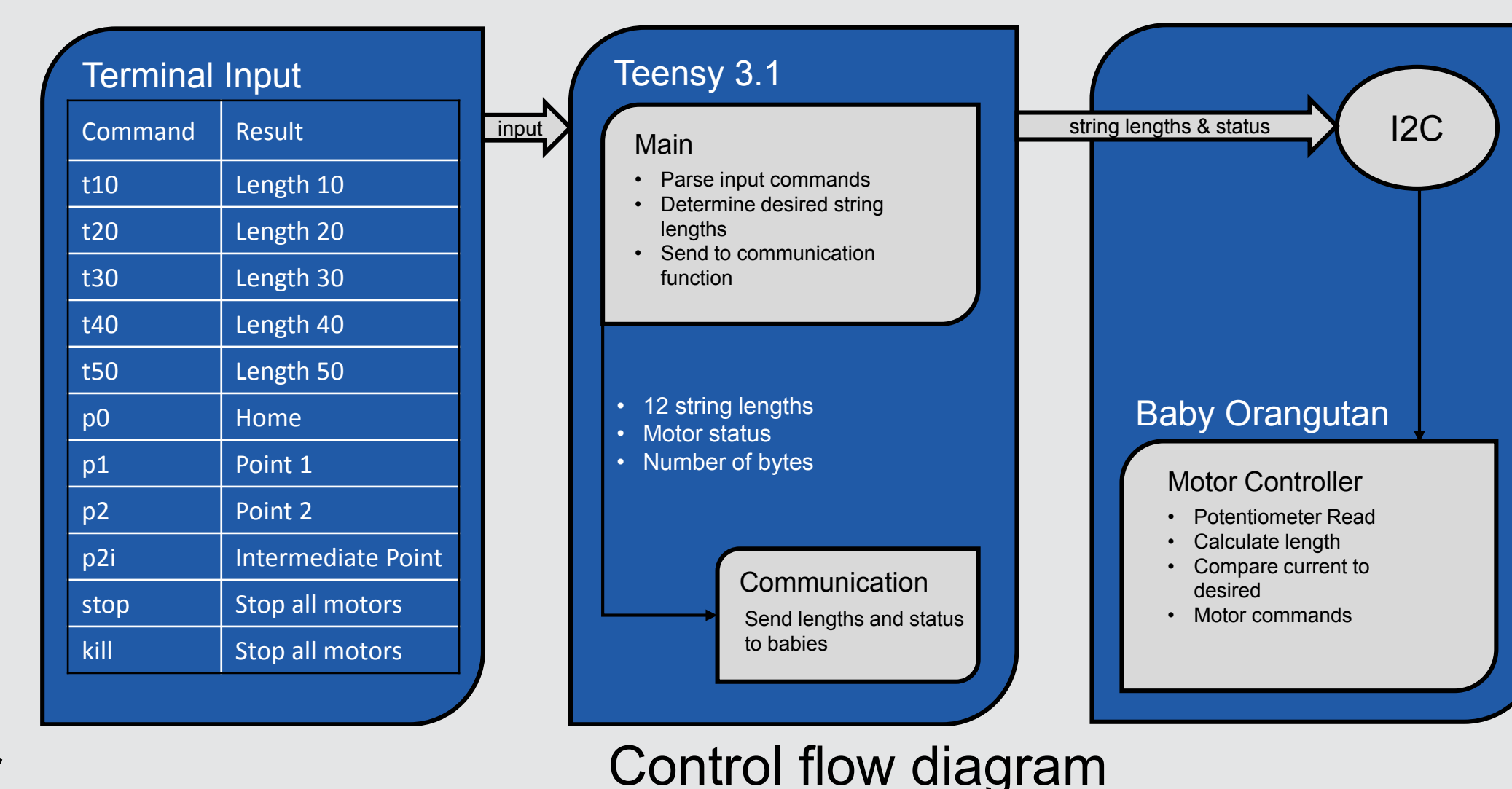
Payload Design

Payload Mass 3 kg
Battery Mass 0.4 kg
Scientific Mass 2.6 kg



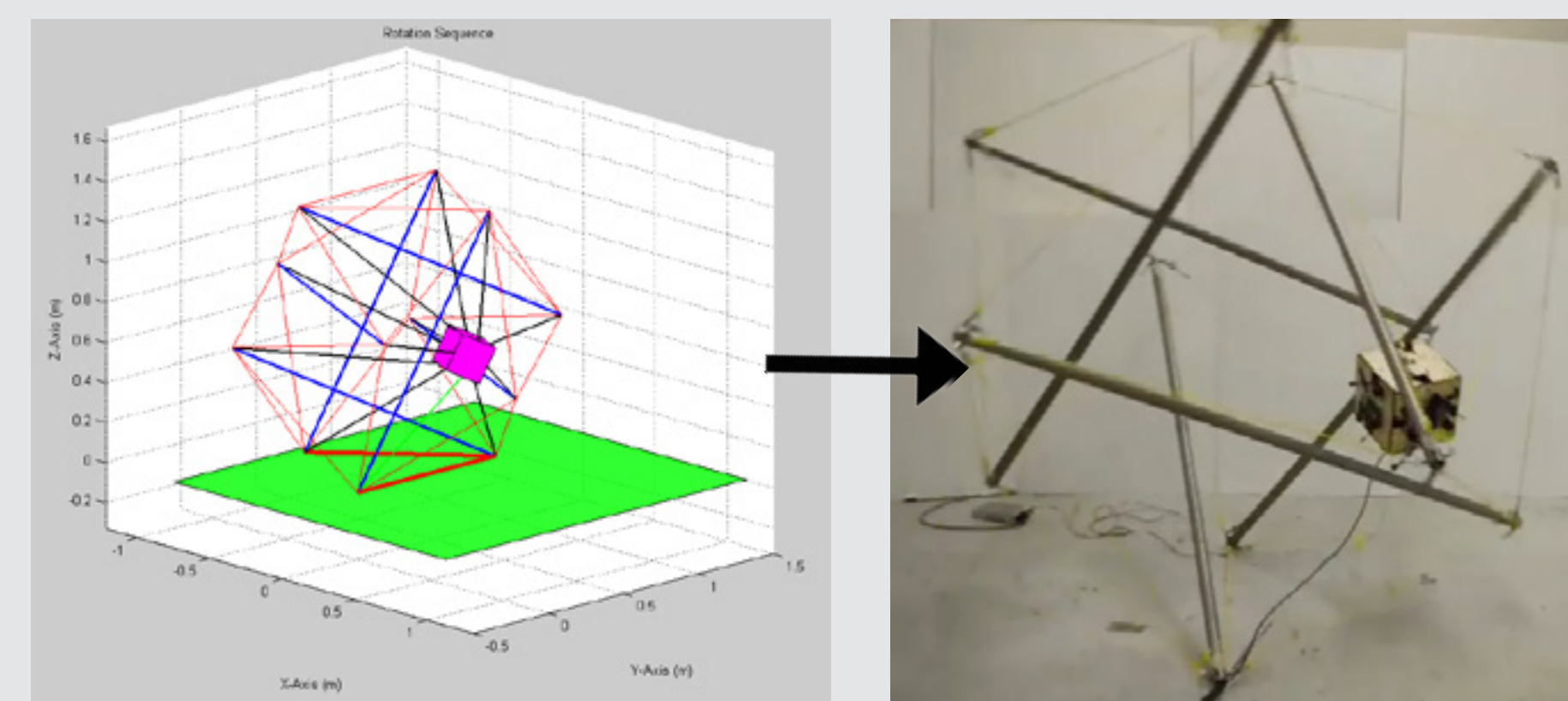
System & Software Architecture

- 1 Teensy 3.1 microcontroller
- 6 Baby Orangutan microcontrollers
- 12 DC Motors
- 12 Geared potentiometers
 - 10-Turn potentiometer
 - 4:1 Gear ratio
 - Absolute positioning



Tipping Model Validation

A Matlab program generated string lengths for tipping points. String lengths were then altered during testing to make up for errors in application, and springs were implemented for compliance and safety.



Payload Routing

An Isocohedron Tensegrity structure was used to test the payload system. This type of Tensegrity has two face variations: an isosceles triangle face and an equilateral triangle face.

The isosceles face can be tipped using a single set of string lengths. It moves from home to the point, and the payload receives one command.

The equilateral face requires two sets of string lengths: one to bring the payload up out of the way of the struts and one to swing it over to the tipping point.

